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Reflecting the Global Stocktake mitigation efforts in NDCs

Discussion Paper

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1. Global efforts needed

The Global Stocktake (GST) under the Paris Agreement, concluded during the UNFCCC COP28 at the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA) (UNFCCC 2023a), has given a clear signal that current climate action is insufficient and provided a strong call for increased action. It recognized that according to the latest version of the synthesis report on Nationally Determined Contributions (NDCs) (UNFCCC 2023b) implementing current NDCs would reduce emissions on average by two per cent by 2030 relative to 2019 (UNFCCC 2023a, paragraph 21). It sets this finding into context by referring to the IPCC (2023) that deep, rapid and sustained reductions of global greenhouse gas emissions are required to keep the temperature rise limit of 1.5 °C by the end of the century within reach: 43 per cent by 2030, 60 per cent by 2035 compared with the 2019 level and reaching net zero carbon dioxide emissions by 2050 (UNFCCC 2023a, paragraph 27). Parties also agreed to **encourage NDCs that are aligned with limiting global warming to 1.5 °C** (UNFCCC 2023a, paragraph 39).

The Global Stocktake taking place every five years is designed to inform new NDCs, where countries spell out their climate ambition and outline their route to its implementation. This Global Stocktake-NDC cycle of increasingly ambitious climate action is at the heart of the Paris Agreement (UNFCCC 2015) and **Parties are required to detail in their NDC how it has been informed by the outcomes of the GST** (UNFCCC 2018a, Annex I paragraph 4(c)).

This discussion paper aims to provide an overview how Parties could reflect explicitly in their NDCs their contribution to the global efforts on mitigation that they agreed to at COP28. **The table below provides an overview of measures that directly relate to these global efforts on mitigation and also lists indicators that could be used to track progress as well as examples to set a baseline (reference point) and a target at the national level. It is to be noted that similar discussions for other aspects of the response to climate change, such as adaptation and finance, could be useful, but are not included here.**

The purpose of this exercise is to provide an approach which Parties can use to quantify and track their contribution to the global efforts on mitigation they agreed to in the GST decision. The inclusion of NDC targets that mirror the global efforts would show accountability on the Global Stocktake decision taken, which explicitly "calls on Parties to contribute to the following global efforts" (UNFCCC 2023a, paragraph 28).

The information provided here is intended as an input for Parties preparing their NDCs and their national measures that enable them to plan, communicate and implement NDCs with higher ambition. It does so in the context of the encouragement of the GST decision to provide "ambitious, economy-wide emission reduction targets, covering all greenhouse gases, sectors and categories and aligned with limiting global warming to 1.5 °C, as informed by the latest science, in the light of different national circumstances" (UNFCCC 2023a, paragraph 39).

2. How to reflect the contribution to the global efforts in the NDCs

As illustrated in the table below, there is a wide range of mitigation actions available which can be used to contribute to the global efforts called for in the Global Stocktake decision (UNFCCC 2023a). **Progress in implementing these actions can be tracked using appropriate indicators. With such indicators, Parties can quantify and track their contributions to these global efforts.**

The Global Stocktake is key in informing Parties in the preparation of their new or updated NDCs. The information which Parties have to include in their NDCs has been defined by the CMA in an annex on "information to facilitate clarity, transparency and understanding of NDCs" (UNFCCC 2018a Annex I). This information includes, inter alia, the target(s), time frame, scope and methodological approaches used. Parties also need to specify how the preparation of their NDC has been informed by the outcomes of the Global Stocktake (UNFCCC 2018a, Annex I, paragraph 4c). In practice, most Parties complemented the information requested by the CMA with additional descriptive information, such as a general introduction or a description of the main measures that contribute to the implementation of the NDC target(s).

The global efforts agreed at the first Global Stocktake can be taken up by Parties in several ways:

- **Parties can include in their NDC additional specific mitigation actions** that contribute to the global efforts. Such additional actions will allow Parties to formulate and achieve more ambitious emission reduction targets and provide concrete information on what they plan to implement to achieve them. Information on these actions could be included in the descriptive part of the NDC.

- In addition, **Parties can define indicators to track these additional mitigation actions**. As an example, installed renewable energy capacity would be an indicator for tracking a Party's contribution to the global effort of tripling renewable energy capacity by 2030. The indicators, including target values, could be included in the descriptive part of the NDC. The target value for a specific mitigation action would thus not necessarily constitute a new NDC target but provide context and spell out (1) what efforts are intended to contribute to achieving its greenhouse gas reduction target and (2) how the Party contributes to the global efforts commonly agreed in the GST.

- Finally, **Parties can define new NDC targets that mirror the global efforts** called for in the GST decision (UNFCCC 2023a). As an example, they could define a specific level of renewable energy capacity as one of their updated NDC targets for 2030. Such a target would mirror the global effort of tripling renewable energy capacity by 2030.

The **definition of NDC targets that mirror the global efforts would show accountability** on the decision taken by the CMA, which "called on Parties to contribute to the following global efforts" (UNFCCC 2023a, paragraph 28).

Many Parties communicated policies and measures as components of their NDCs. According to UNFCCC (2018a, Annex I, paragraph 1), Parties are to provide quantifiable information on the reference point of their NDC. For policies and measures, where quantifiable information is not applicable, Parties are to provide other relevant information.

Several Parties included quantitative sectoral targets in their NDCs, such as energy efficiency or reforestation targets. They could align these sectoral targets with the global efforts called for in the GST decision (UNFCCC 2023a).

The tracking of progress towards implementing and achieving a Party's NDC is governed by the Modalities, Procedures and Guidelines for the Transparency Framework (UNFCCC, 2018b, Annex). For this tracking of progress, each Party shall identify indicator(s) which shall be relevant to its NDC and may be either qualitative or quantitative (UNFCCC 2018b, Annex, paragraph 65). A wide range of indicators is possible, from GHG emissions and removals to energy-related indicators and qualitative indicators for specific policies or measures (UNFCCC 2018b, Annex, paragraph 66). **The indicators presented in the table below could all be used for tracking progress, as long as they are relevant to the Party's NDC.**

When a Party decides to include additional NDC targets and/or indicators for tracking progress, i.e. not in the descriptive part of the NDC, but in the mandatory part under the information to facilitate clarity, transparency and understanding of nationally determined contributions as per UNFCCC (2018a, Annex I) the following aspects should be taken into account:

- According to the Paris Agreement (UNFCCC 2015, Article 4.4) "developed country Parties should continue taking the lead by undertaking economy-wide absolute emission reduction targets. Developing country Parties should continue enhancing their mitigation efforts, and are encouraged to move over time towards economy-wide emission reduction or limitation targets in the light of different national circumstances." The GST decision "encourages Parties to come forward in their next NDC with ambitious, economy-wide emission reduction targets, covering all greenhouse gases, sectors and categories and aligned with limiting global warming to 1.5 °C, as informed by the latest science, in the light of different national circumstances" (UNFCCC 2023a, paragraph 39). Hence, the addition of new targets under the formally tracked part of the NDC could distract from the strong call for an economy-wide reduction of greenhouse gas emissions.

- Due to the dynamic nature of many sectors, the mitigation potential at sectoral level can change substantially over time. As an example, if renewable energy costs decrease faster than expected, Parties may be able to substantially over-achieve a renewable energy target. However, if fossil fuel prices increase, they may not be able to achieve a target on fossil fuel subsidy phase-out without risking energy poverty. Committing to one ambitious economy-wide emission reduction target comes with the advantage that specific mitigation actions and related targets can still be refined over time, taking into account the specific economic and technological development.

Hence, the inclusion of efforts from paragraphs 28, 33, 35 and 36 of the decision on the Global Stocktake in an updated or new NDC requires careful consideration.

Nevertheless, **Parties that decide to focus on one comprehensive quantified target have the opportunity to provide additional information in their NDC on how they plan to achieve this target. They can include information on specific measures, targets and indicators** in the descriptive part of their NDC. By doing so, they can spell out how they contribute to the global efforts, which were collectively agreed in the GST according to their national circumstances, and recognizing that many can do more (Climate Analytics and NewClimate Institute 2024). It should in this context be noted that according to Article 4.3 of the Paris Agreement, each Party's successive NDC will reflect 'its highest possible ambition' (UNFCCC 2015).

Parties could therefore also decide to pursue efforts that go beyond what was agreed at COP28. As an example, several Parties already went beyond the acceleration of 'efforts towards the phase-down of unabated coal power' by successfully implementing a complete national phase-out of coal power.

In order to achieve the required deep, rapid and sustained reductions in global greenhouse gas emissions recognized by UNFCCC (2023a, paragraph 27), Parties need to go beyond contributing to the global efforts agreed in that decision and explore all possible mitigation actions, depending on their national circumstances and reflecting their highest possible ambition.

Table: Measures and indicators for the global efforts on mitigation called for in the Global Stocktake

Efforts on mitigation in GST Decision (UNFCCC 2023a)	Mitigation actions that contribute to these efforts	Indicators for tracking progress in implementing these mitigation actions	Example for a reference year and metric for the indicator at the national level	Example for an indicator target at the national level	How could a more ambitious effort be formulated?
Renewable Energy §28(a) *Tripling renewable energy capacity globally […] by 2030*	Increase solar power generation capacity. Increase wind power generation capacity. Increase the capacity of other renewable energy sources. Develop the electricity grid and storage infrastructure.	Installed renewable electricity generation capacity	X megawatts in 2022	X megawatts in 2030 and 2035	In order to allow for a global tripling of renewable energy capacity, Parties with a low level in the reference year and/or high potential for increasing renewable capacity should commit to an increase of more than a factor of three. Parties should consider that costs for wind and solar energy as well as energy storage have decreased rapidly and further cost reductions can be expected during this decade.
		Installed renewable energy capacity (electricity, buildings, vehicles, industry)	X megawatts in 2022	X megawatts in 2030 and 2035	
		Share of renewable energy in final energy consumption	X % in 2022	X % in 2030 and 2035	
		Energy storage capacity	X MWh in 2022	X MWh in 2030 and 2035	
		Electricity grid expansion	X km in 2022	X km in 2030 and 2035	
Energy Efficiency [§28(a) continued:] *doubling the global average annual rate of energy efficiency improvements by 2030*	Introduce national standards for energy efficiency at national, sectoral and product level. Support energy efficiency improvements in all sectors of the economy.	Energy intensity improvement rate, i.e., *annual rate of change in total primary energy supply divided by GDP* (COP28 Presidency et al. 2023) *annual rate of change in total final energy supply divided by GDP*	X % in 2022	X % in 2030 and 2035	In order to allow for a global doubling of this rate, Parties with a low level in the reference year and/or high potential for increasing this rate should commit to an increase higher than factor two. An improvement related to energy intensity (unit of energy supply divided by unit of GDP) does not necessarily lead to GHG emission

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	Establish minimum standards for public buildings and public procurement Public information campaigns on energy efficiency and energy demand reduction.	Energy intensity measured in terms of *primary energy supply divided by GDP* (SDG indicator 7.3.1) (UNSTAT 2022)	X USD per megajoule in 2022	X USD per megajoule in 2030 and 2035	reductions. Energy efficiency is an important factor for decarbonization, but it needs to be accompanied by a shift towards non-fossil fuels.
	Reduce fossil fuel subsidies and introduce carbon pricing	Primary and final energy consumption compared to a reference scenario (EU 2023)	X gigajoules in 2022	X % below the reference value in 2030 and 2035	
Coal Power phase-down §28(b) *Accelerating efforts towards the phase-down of unabated coal power*	Develop and implement phase-out plans for fossil fuel power plants. Stop new fossil fuel infrastructure projects.	Primary energy consumption of unabated coal for power generation	X gigajoules in 2022	X gigajoules in 2030 and 2035	It should be noted that already in 2021, the COP26 president proposed that the CMA should call upon Parties to accelerate 'efforts towards the *phase-out* of unabated coal power' (COP26 presidency 2021). Some Parties that rely on coal in their energy mix were not able to support this wording, but many Parties are planning a *complete coal power phase-out*. Parties should aim at completely phasing out coal power, without making use of abatement technologies. Recent developments in prices suggest that abated coal power generation will not be
		Installed unabated coal power generation capacity	X megawatts in 2022	X megawatts in 2030 and 2035	

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					competitive with renewable power generation.
Net zero energy systems §28(c) *Accelerating efforts globally towards net zero emission energy systems, utilizing zero- and low-carbon fuels well before or by around mid-century*	Increase renewable power generation capacity and develop the electricity grid and storage infrastructure. Foster renewable energy in the building sector. Electrify the vehicle fleet. Electrify industry.	Share of zero-carbon fuels in final energy consumption Share of low-carbon fuels in final energy consumption	X % in 2022	X % in 2030 and 2035	In order to reach overall net zero emissions, hard-to abate emissions need to be compensated. If low carbon fuels are still used in the energy sector by 2050, it is unlikely that overall net zero emissions can be reached. Parties should commit to net zero or negative emissions in the energy system, and phase out *all* fossil fuels, including low-carbon fuels, well before mid-century.
Transition away from fossil fuel §28(d) *Transitioning away from fossil fuels in energy systems, in a just, orderly and equitable manner, accelerating action in this critical decade, so as to achieve*	Stop permitting new fossil fuel exploration. Decrease production of fossil fuels. Install renewable power generation capacity and develop the electricity grid and storage infrastructure.	Fossil fuel consumption	X gigajoule in 2022	X gigajoule in 2030 and 2035	The urgent need for increased climate action in this critical decade requires *transformative* change, and alternatives to fossil fuels in energy systems are readily available. The wording used in the GST (UNFCCC 2023a) ('transitioning away […] in an orderly manner') does not live up to this urgency. Hence, Parties should aim at a *phase-out*, rather than a
		Primary energy supply by fuel type (Coal, Oil, Gas, Nuclear, Biomass, Hydro, Wind, Solar, Geothermal, Ocean) Final energy consumption by fuel type (JRC 2023)	X gigajoule by fuel type in 2022	X gigajoule by fuel type in 2030 and 2035	

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net zero by 2050 in keeping with the science	Foster renewable energy and retrofitting in the building sector. Electrify the vehicle fleet.	Power generation by fuel type (Coal, Oil, Gas, Nuclear, Biomass, Hydro, Wind, Solar, Geothermal, Ocean) (JRC 2023)	X Terawatt hour in 2022	X Terawatt hour in 2030 and 2035	*transitioning away* from fossil fuels if such a phase-out is within their range of possibilities.
Zero- and low- Emission Technologies §28(e) *Accelerating zero- and low-emission technologies, including, inter alia, renewables, nuclear, abatement and removal technologies such as carbon capture and utilization and storage, particularly in hard-to-abate sectors, and low-carbon hydrogen production;*	Install renewable power generation capacity and develop the electricity grid and storage infrastructure, including renewable hydrogen production, transport and storage. Foster renewable energy in the building sector. Electrify the vehicle fleet. Electrify and implement zero-emission technologies in industry.	Share of zero- and low-carbon fuels in final energy consumption in relevant sectors Share of newly registered electric vehicles Electrification rate of industry	X % in 2022	X % in 2030 and 2035	The acceleration of low-emission technologies contributes to decarbonization only if these technologies replace high-emission technologies, and don't lead to fossil lock-Ins. The continued use of *low-carbon* fuels, such as low-carbon hydrogen, renders the reaching of net-zero emissions difficult. Parties should focus on accelerating the development and implementation of *zero-emission* technologies. Substitution of construction material with a high CO_2 footprint with a low CO_2 footprint, including storage of CO_2 in wood products.

Efforts on mitigation in GST Decision (UNFCCC 2023a)	Mitigation actions that contribute to these efforts	Indicators for tracking progress in implementing these mitigation actions	Example for a reference year and metric for the indicator at the national level	Example for an indicator target at the national level	How could a more ambitious effort be formulated?
Non-CO_2 emissions §28(f) *Accelerating and substantially reducing non-carbon-dioxide emissions globally, including in particular methane emissions by 2030*	Strengthen regulations for monitoring and leak detection and repair. Provide incentives for low-methane agricultural practices. Provide incentives for low-nitrous oxide practices in chemical industry and agriculture. Replace landfilling by other waste management approaches such as recycling or incineration with CCS and energy use. Capture methane emissions from landfills. Improve wastewater management to reduce emissions of methane and nitrous oxide from wastewater. Phase-down of hydrofluorocarbons (HFCs)	Level of non-CO_2 GHG emissions	X kilotons of CO_2 equivalents in 2022	X kilotons of CO_2 equivalents in 2030 and 2035	More ambitious efforts could include quantitative reduction targets, separately for the sectors energy, agriculture and waste. In the agriculture sector, the potential for reductions strongly depends on national circumstances. Countries with high meat and dairy production have a higher reduction potential. Accelerating the reduction steps of HFCs compared to the Kigali Amendment obligations and moving from an HFC phase-down to an HFC phase-out.
		Level of methane emissions	X kilotons of CO_2 equivalents in 2022	X kilotons of CO_2 equivalents in 2030 and 2035	
		Level of nitrous oxide emissions	X kilotons of CO_2 equivalents in 2022	X kilotons of CO_2 equivalents in 2030 and 2035	
		Level of methane emissions per sector: energy, agriculture and waste	X kilotons of CO_2 equivalents in 2022	X kilotons of CO_2 equivalents in 2030 and 2035	
		Ratification and implementation of the Kigali Amendment	CO2 equivalents in the baseline year as determined by the Kigali Amendment for consumption and production	% reduction compared to the baseline year as determined by the Kigali Amendment	

Efforts on mitigation in GST Decision (UNFCCC 2023a)	Mitigation actions that contribute to these efforts	Indicators for tracking progress in implementing these mitigation actions	Example for a reference year and metric for the indicator at the national level	Example for an indicator target at the national level	How could a more ambitious effort be formulated?
Transport §28(g) *Accelerating the reduction of emissions from road transport on a range of pathways, including through development of infrastructure and rapid deployment of zero-and low-emission vehicles;*	Incentivise a shift towards electric vehicles through regulations, pricing schemes or subsidies. Provide charging infrastructure. Expand public transport. Provide an environment for sustainable transportation modes such as walking and cycling. Measures to reduce final energy consumption for the transport of goods via road, rail and waterways Measures to reduce final energy consumption in passenger transport by rail, air and road (public and private)	Level of greenhouse gas emissions from road transport	X kilotons of CO_2 equivalents in 2022	X kilotons of CO_2 equivalents in 2030 and 2035	Parties could commit to the phase-out of new passenger cars with combustion engines by a certain year. Similarly, Parties could ban short-haul flights if train services provide time efficient alternatives. Several Parties already included in their legislation the complete phase-out of new passenger cars with combustion engines.
		Shares of transport modes (cars, public transport, cycling, walking) in overall passenger transport volume	X % in 2022	X % in 2030 and 2035	
		Share of newly registered electric vehicles	X % in 2022	X % in 2030 and 2035	
		Final energy consumption in goods transport	X gigajoule in 2022	X gigajoule in 2030 and 2035 (percentage reduction)	
		Final energy consumption in passenger transport	X gigajoule in 2022	X gigajoule in 2030 and 2035 (percentage reduction)	
		Average travel times to the nearest medium-sized	Minutes in 2022	Minutes in 2030 and 2035	

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		or major city by public transport			
Fossil fuel subsidies §28(h) *Phasing out inefficient fossil fuel subsidies that do not address energy poverty or just transitions, as soon as possible;*	Phase out fossil fuel subsidies. Provide support for alternative fuels. Provide support for alternative transportation modes.	Total level of fossil fuel subsidies	X million USD in 2022	X million USD in 2030 and 2035	The use of the wording 'inefficient' suggests that efficient fossil fuel subsidies do not need to be phased out. Efficient fossil fuel subsidies would facilitate the continued use of fossil fuels, including associated greenhouse gas emissions. Hence Parties should commit to the phase-out of all fossil fuel subsidies (unless they specifically address energy poverty or just transition). In addition, Parties should aim at addressing energy poverty and just transition with other instruments, such as subsidies for renewable energy.
		Total fossil fuel subsidies as a percentage of GDP (IMF 2023)	X % in 2022	X % in 2030 and 2035	
Nature conservation §33 *Further emphasizes the importance of conserving, protecting and restoring nature and ecosystems towards*	Prevent, halt and reverse land degradation and reduce degraded land.	Area of sustainably managed land	% of the national territory in 2022	% of the national territory in 2030 and 2035	Parties could commit to a target for greenhouse gas removals from the LULUCF sector, as part of their economy-wide absolute emission reduction target.
		Change in the area of degraded land	% in 2022	% in 2030 and 2035	

Efforts on mitigation in GST Decision (UNFCCC 2023a)	Mitigation actions that contribute to these efforts	Indicators for tracking progress in implementing these mitigation actions	Example for a reference year and metric for the indicator at the national level	Example for an indicator target at the national level	How could a more ambitious effort be formulated?
achieving the Paris Agreement temperature goal, including through enhanced efforts towards halting and reversing deforestation and forest degradation by 2030, and other terrestrial and marine ecosystems acting as sinks and reservoirs of greenhouse gases and by conserving biodiversity, while ensuring social and environmental safeguards, in line with the Kunming-Montreal Global Biodiversity Framework;	Prevent, halt and reverse deforestation and forest degradation. Support reforestation and sustainable forest management with a long-term perspective. Expand conservation areas. Implement sustainable land use and management plans. Protection of intact peatlands/wetlands and rewetting.	Area of land protected	% of the national territory in 2022	% of the national territory in 2030 and 2035	Contribute to the G20 Global Land Initiative, with its ambition to prevent, halt and reverse land degradation with an ambition to reduce degraded land by 50 percent by 2040
		Reforested area	X hectares in 2022	X hectares in 2030 and 2035	
		Deforested area	X hectares in 2022	X hectares in 2030 and 2035	
		Area where forest degradation has been reversed	X hectares in 2022	X hectares in 2030 and 2035	
		Forest area certified as sustainably managed	% of forest area certified in 2022	% of forest area certified in 2030 and 2035	
		Net removals of CO_2 by sinks in the land sector	X kt of CO_2 in 2022	X kt of CO_2 in 2030 and 2035	
		Area of restored / rewetted peatlands	X hectares of peatlands in 2022	X hectares of peatlands in 2030 and 2035	

Efforts on mitigation in GST Decision (UNFCCC 2023a)	Mitigation actions that contribute to these efforts	Indicators for tracking progress in implementing these mitigation actions	Example for a reference year and metric for the indicator at the national level	Example for an indicator target at the national level	How could a more ambitious effort be formulated?
Oceans and coastal ecosystems §35 *Invites Parties to preserve and restore oceans and coastal ecosystems and scale up, as appropriate, ocean-based mitigation action;*	Expand conservation areas. Restore degraded coastal ecosystems	Area of ocean and coastal ecosystems preserved	X hectares in 2022	X hectares in 2030 and 2035	Parties could commit to specific actions with high mitigation potential.
Sustainable lifestyles and circular economy §36 *Notes the importance of transitioning to sustainable lifestyles and sustainable patterns of consumption and production in efforts to address climate change, including through circular economy approaches, and encourages efforts in this regard;*	Facilitate re-use and recycling. Facilitate the transition towards low-emission transport modes. Facilitate lifestyle changes including towards lower meat consumption. Support initiatives to reduce food waste. Reduction of raw material consumed	Share of recycled waste in total waste	X % in 2022	X % in 2030 and 2035	Parties could commit to specific mitigation actions, such as those listed here and set related quantitative targets.
		Reduction of carbon emissions associated with raw material consumption Reduction of carbon emissions associated with consumer food waste / construction and demolition (further indicators on circular economy approaches available at OECD 2020 and Rommens et al. 2024)	X kt of CO_2 equivalents in 2022 X kt of material per capita in 2022 X kt of waste produced by construction and demolition per capita in 2022	X kt of CO_2 equivalents in 2030 and 2035 X kt of material per capita in 2030 and 2035 X kt of waste produced by construction and demolition per capita in 2030 and 2035	

Efforts on mitigation in GST Decision (UNFCCC 2023a)	Mitigation actions that contribute to these efforts	Indicators for tracking progress in implementing these mitigation actions	Example for a reference year and metric for the indicator at the national level	Example for an indicator target at the national level	How could a more ambitious effort be formulated?
	Facilitate the transition towards a circular and climate-neutral construction	Shares of transport modes (cars, public transport, cycling, walking) in overall transport volume	X % in 2022	X % in 2030 and 2035	

Sources: Own compilation based on Moosmann et al. (2023) and specific indicators as per references in the table.

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